

The Claims

What is claimed is:

5 1. An implant comprising a body having an inner sheath and at least one outer sheath, each sheath being formed from a different bone and having an interior surface and an exterior surface, wherein the exterior surface of each outer sheath contacts the interior surface of no more than one other outer sheath.

10 2. The implant of claim 1, further comprising a core disposed in the inner sheath and formed from a bone other than the bones of the sheaths.

3. The implant of claim 2, wherein the core is formed of cancellous bone and at least one sheath is formed of cortical bone.

15 4. The implant of claim 2, wherein at least one sheath is formed of cancellous bone and the core is formed of cortical bone.

5. The implant of claim 2, wherein the bones comprise at least one of
20 autograft, allograft, and xenograft bone tissue.

6. The implant of claim 5, wherein the bone tissue of at least one bone is partially demineralized or demineralized.

25 7. The implant of claim 2, wherein the body comprises a cross-section of the sheaths and core, the cross-section including at least a portion of each sheath and core.

8. The implant of claim 7, wherein the sheaths and core are coupled together with at least one fastener.

30 9. The implant of claim 8, wherein the at least one fastener is selected from a screw, key, pin, peg, rivet, cotter, nail, spike, bolt, stud, staple, boss, clamp, clip, dowel, stake, hook, anchor, tie, band, crimp, and wedge.

35 10. The implant of claim 8, wherein the at least one fastener intersects each of the sheaths and core.

11. The implant of claim 7, wherein at least two of the sheaths and core are bonded together with a bonding agent.

12. The implant of claim 2, wherein at least one of the inner sheath, an
5 outer sheath, and the core is at least partially dehydrated to fit against a surrounding mating surface.

13. The implant of claim 2, wherein at least one of the inner sheath, an outer sheath, and the core is at least partially dehydrated to fit within a surrounding inner
10 sheath or outer sheath having a greater moisture content.

14. The implant of claim 1, wherein contacting surfaces of adjacent sheaths are machined surfaces so that the contour of the contacting surfaces is about the same.

15. The implant of claim 14, wherein the machined surfaces permit press-fitting of one sheath into another sheath.

16. The implant of claim 1, wherein the bones are selected from a femur,
20 tibia, humerus, fibula, ulna, and radius.

17. The implant of claim 1, further comprising at least one supplemental sheath having an interior surface and an exterior surface, wherein the exterior surface of each supplemental sheath contacts the interior surface of no more than one other sheath and
25 the interior surface of each supplemental sheath contacts the exterior surface of no more than one other sheath, wherein the at least one supplemental sheath is formed of a material selected from metals, alloys, ceramics, polymers, and composites.

18. The implant of claim 1, wherein at least one sheath is packed with
30 bone growth materials.

19. The implant of claim 1, wherein at least one sheath further comprises alignment indicia.

35 20. The implant of claim 1, wherein the exterior surface is spaced from a portion of the interior surface.

21. An implant comprising a body formed from a cross-section of a core and a plurality of sheaths with each sheath having an inner surface and an outer surface, wherein at least two sheaths are formed from different bones, the outer surface of a first sheath has about the same contour as the inner surface of a second sheath so that the first and second sheaths mate together, and the cross-section includes at least a portion of each sheath and core.

22. The implant of claim 21, wherein the core is formed from a bone other than the bones of the sheaths.

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23. The implant of claim 22, wherein the core is formed of cancellous bone and at least one sheath is formed of cortical bone.

24. The implant of claim 22, wherein at least one sheath is formed of cancellous bone and the core is formed of cortical bone.

25. The implant of claim 22, wherein the bones comprise at least one of autograft, allograft, and xenograft bone tissue.

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26. The implant of claim 25, wherein the bone tissue of at least one bone is partially demineralized or demineralized.

27. The implant of claim 22, wherein the sheaths and core are coupled together with at least one fastener.

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28. The implant of claim 27, wherein the at least one fastener is selected from a screw, key, pin, peg, rivet, cotter, nail, spike, bolt, stud, staple, boss, clamp, clip, dowel, stake, hook, anchor, tie, band, crimp, and wedge.

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29. The implant of claim 27, wherein the at least one fastener intersects each of the sheaths and core.

30. The implant of claim 22, wherein the sheaths and core are bonded together with a bonding agent.

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31. The implant of claim 22, wherein at least one of the first sheath, second sheath, and core is at least partially dehydrated to fit against a surrounding mating surface.

5 32. The implant of claim 22, wherein at least one of the first sheath, second sheath, and core is at least partially dehydrated to fit within a surrounding first sheath or second sheath.

10 33. The implant of claim 21, wherein contacting surfaces of adjacent sheaths are machined surfaces so that the contour of the contacting surfaces is about the same.

15 34. The implant of claim 33, wherein the machined surfaces permit press-fitting of one sheath into another sheath.

35. The implant of claim 21, wherein the bones are selected from a femur, tibia, humerus, fibula, ulna, and radius.

20 36. The implant of claim 21, further comprising at least one supplemental sheath having an interior surface and an exterior surface, wherein the exterior surface of each supplemental sheath contacts the interior surface of no more than one other sheath and the interior surface of each supplemental sheath contacts the exterior surface of no more than one other sheath, wherein the at least one supplemental sheath is formed of a material selected from metals, alloys, ceramics, polymers, and composites.

25 37. The implant of claim 21, wherein at least one sheath is packed with bone growth materials.

30 38. The implant of claim 21, wherein at least one sheath further comprises alignment indicia.

39. The implant of claim 21, wherein the outer surface is separated from a portion of the inner surface.

40. An implant comprising a body having at least one sheath defining a hole with a core fit therein, wherein the body is formed from at least two different bones selected from a femur, tibia, humerus, fibula, ulna, and radius.

5 41. An implant comprising at least two layers of bone components coupled to each other, the components together defining at least one securing region, and at least one insertable securing element adapted for placement in the at least one securing region.

10 42. The implant of claim 41, wherein the at least one securing region is a recess or hole.

15 43. The implant of claim 42, wherein the insertable securing element is a screw, key, pin, peg, rivet, cotter, nail, spike, bolt, stud, staple, boss, clamp, clip, dowel, stake, hook, anchor, tie, band, crimp, or wedge.

44. The implant of claim 42, wherein each layer is formed from a different bone selected from a femur, tibia, humerus, fibula, ulna, and radius.

20 45. The implant of claim 44, wherein at least one layer is formed of cancellous bone and at least one layer is formed of cortical bone.

46. The implant of claim 45, wherein the layers comprise at least one of autograft, allograft, and xenograft bone tissue.

25 47. The implant of claim 46, wherein the bone tissue of at least one bone is partially demineralized or demineralized.

48. The implant of claim 42, wherein the layers are bonded together with 30 a bonding agent.

49. The implant of claim 42, wherein a first layer is at least partially dehydrated to mate against at least one other layer.

35 50. The implant of claim 42, wherein adjacent layers are provided with mutually contacting surfaces that are machined to have about the same contour.

51. The implant of claim 42, wherein the contacting surfaces of adjacent layers are press-fit together.

52. The implant of claim 42, further comprising at least one supplemental layer coupled to at least one of the layers of bone components, wherein the at least one supplemental layer is formed of a material selected from metals, alloys, ceramics, polymers, and composites.

53. The implant of claim 41, wherein the implant further comprises a chamber packed with bone growth materials.

54. The implant of claim 41, wherein at least one layer further comprises alignment indicia.

15 55. The implant of claim 41, wherein the outer surface is separated from a portion of the inner surface.

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